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Original Article

Reliability and validity of Chinese version of Cataldo Lung Cancer Stigma Scale

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ABSTRACT

Purpose: To translate and apply the Cataldo Lung Cancer Stigma Scale (CLCSS) for Chinese populations and test the reliability and validity of the modified scale.
Method: A total of 150 lung cancer patients were recruited from three tertiary hospitals in Shandong province and were tested using the Chinese version of CLCSS to assess its reliability and validity.
Result: The Cronbach's α coefficient of the Chinese version of CLCSS and the four subscales ranged from 0.599 to 0.884, and the test–retest reliability ranged from 0.601 to 0.881. The content validity index of the scale was 0.875. Four factors were extracted by exploratory factor analysis that explained 58.6% of the total variance.
Conclusion: The Chinese version of CLCSS is a reliable and valid measure of stigma among Chinese patients with lung cancer.

1. Introduction

Stigma refers to disapproval of individuals due to undesirable features such as special appearance, behaviour, or group identity. Stigmas usually emerge under specific circumstances and situations such as drug abuse, AIDS, homosexuality, and disability [1]. Health-related stigma (HRS) is a perceived stigma that is characterized by experiences of exclusion, rejection, blame from others, or diminished self-worth [2]. Stigmatized individuals usually experience prejudice, discrimination, and isolation from others, which not only disrupts daily life and social interactions. The consequences of these stigmas also produce serious negative

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emotions, which have been shown to influence patients' health [3–7].

Lung cancer is currently the most common form of cancer and leading cause of cancer deaths in the world. In recent years, studies have indicates there is a social stigma associated with lung cancer patients. Furthermore, compared with other forms of cancer, lung cancer patients experience a larger amount of psychological distress [8–11]. This stigma could have negative impacts on the mental and physical health of the lung cancer patients, leading to both strained social relationships and an increase in patient mortality [2]. To better understand this stigma and its effects on patients, Cataldo developed the Cataldo Lung Cancer Stigma Scale (CLCSS) [2], a reliable and valid measure of health-related stigma for lung cancer patients. However, this stigma has not been adequately studied in Chinese populations. In the present study, we developed and evaluated a Chinese version of CLCSS to identify the presence and impact of lung cancer stigma in Chinese patients.

2. Materials and methods

2.1. Patients

A total of 150 lung cancer patients were randomly recruited for this study. We collected data from departments of oncology, thoracic surgery and respiratory in three Class III, Grade I hospitals in Shandong province from June through September 2013. Participants were eligible to take part in the study if they were age 20 years or older, diagnosed with lung cancer by pathological examination, aware of their diagnosis, conscious and also able to express their own opinions, and provided informed consent.

During the stage of formal testing, a total of 150 Chinese Cataldo Lung Cancer Stigma Scales in were distributed, and 124 were returned, among which 117 were considered usable. Thus, the effective returns-ratio was 94%. The average patient age was 58 (SD = 3.2 years, range = 23–82 years old), 86 patients were male and 31 were female. Twenty-nine patients were diagnosed with stage I disease, 51 had stage II disease, 37 had stage III disease at the time of the survey.

2.2. Instruments

2.2.1. Chinese version of Cataldo Lung Cancer Stigma Scale (CLCSS)

The CLCSS, developed in 2011, includes 31 items and 4 subscales: stigma and shame, social isolation, discrimination, and smoking status. Each stigma item was measured through a four-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree) [2]. Higher scores indicate a stronger feeling of stigma felt by the patient. Coefficient alphas ranged from 0.75 to 0.97 for the subscales (0.97 for stigma and shame, 0.96 for social isolation, 0.92 for discrimination, and 0.75 for smoking) and 0.96 for the CLCSS as a whole.

After obtaining approval from the original authors, the CLCSS was translated independently by two English and Chinese linguistic experts to produce a preliminary draft. The translated draft was then translated back in to Chinese by an English major and evaluated by a psychology expert, two oncology clinical medical specialists, two oncology clinical nurse specialists, and two nursing education experts to determine whether the Chinese version of CLCSS could accurately reflect the psychological status of Chinese lung cancer patients. Based on their feedback, six items were deleted from the scale. To stress on the locally special feature, we gave open-end questionnaires to 30 lung cancer patients to provide examples of experiencing a stigma. Six patients were recruited for an in-depth interview, and after analysing and concluding questionnaire and interview results, 13 new items were added to the scale, bringing to total to 38 items. Twenty patients with lung cancer were tested using the scale for a preliminary experiment to assess the accuracy of each entry is accurate. Further revisions were made based on the feedback of the 20 patients to generate the final scale. Each stigma item was measured using a four-point Likert-type scale ranging from 1 (strongly disagree) to 4 (strongly agree). And 27 items were scored inversely. Higher scores indicate a stronger stigma feeling perceived by patients.

2.2.2. Criterion measuring tool

Criteria were measured based on the methods of Cataldo et al [2]. Briefly, Rosenberg Self-esteem Scale (RSES) and Self-Rating Depression Scale (SDS) were used as criterion measuring tools. The RSES, the most commonly used self-esteem measuring tool in modern psychology [12], has a coefficient alpha of 0.84, indicating it is a reliable and valid measure. The SDS includes 20 items and four subscales: spirituality – emotional symptoms, physical disorder, spiritual movement disorder, and distress.

2.3. Data collection

After obtaining the permission of hospitals and departments, the researcher and assistants administered the questionnaires to lung cancer patients who met the inclusion criteria, and assisted patients having difficulty reading or complete the scale. After obtaining permission of the patients and their relatives, the in-depth interviews were carried out with the patients.

2.4. Statistical analysis

The scale was assessed using Cronbach's alphas for internal consistency, test–retest reliability measurements, content validity analysis, factor analysis, parallel analysis, and criterion validity. SPSS19.0 (SPSS INC, Chicago, IL, USA) statistical software package was used in data processing including the reliability measurement, exploratory factor analysis, and Criterion-Related Validity. R statistical software (R Foundation for Statistical Computing, Vienna, Austria) was used for parallel analysis data processing.

3. Result

3.1. Project analysis

For each stigma-related item on the scale, patients were asked to recall "since getting lung cancer, have I experienced the

Table 1 – Chinese version of Cataldo Lung Cancer Stigma Scale (n = 117).

		Item	Loading	R-square
A	1	I feel guilty because I have lung cancer.[a]	0.705	0.841
	2	I think I am not disgrace for having cancer.	0.400	0.356
	3	I work hard to keep my lung cancer a secret.[a]	0.607	0.654
	4	I'm very careful whom I tell I have lung cancer.[a]	0.697	0.863
		I'm afraid someone will tell others that I am suffering from lung cancer.	0.566	0.587
	9	I feel I'm not as good as others because I have lung cancer.[a]	0.544	0.416
	10	I feel set apart, isolated from the rest of the world.[a]	0.695	0.776
	18	My lung cancer diagnosis was delayed because I put off going to the doctor.[a]	0.594	0.665
	19	Some told me lung cancer is what I deserved for smoking.[a]	0.534	0.719
	20	Some told me lung cancer is what I deserved for environment.	0.672	0.488
	22	My lung cancer diagnosis was delayed because my healthcare provider did not take my "smoker's cough" seriously.[a]	0.528	0.48
	24	Because I was suffering from lung cancer, I think I can't what achievements in life	0.523	0.502
	26	I abandon myself because of suffering from lung cancer	0.572	0.648
	27	Because I was suffering from lung cancer, the other people think that I can't what achievements in life	0.559	0.461
B	17	People I care about stopped calling after learning that I have lung cancer.[a]	0.614	0.723
	7	People avoid touching me if they know I have lung cancer.[a]	0.575	0.721
	11	I worry about people discriminating against me.[a]	0.546	0.608
	12	People have physically backed away from me.[a]	0.646	0.828
	13	People avoid you because lung cancer is associated with death.[a]	0.492	0.482
	23	I was hurt how people reacted to learning I have lung cancer.[a]	0.619	0.689
C	14	That tell others I am suffering from lung cancer will bring big trouble for me.	0.448	0.367
	21	I worry that people may judge me when they learn I have lung cancer.[a]	0.543	0.662
	25	Most are uncomfortable around someone with lung cancer.[a]	0.427	0.407
D	6	Others assume that a patient's lung cancer was caused by smoking, even if he or she never smoked.[a]	0.534	0.591
	8	Lung cancer is viewed as a self-inflicted disease.[a]	0.451	0.478
	15	Some people act as though it is my fault that I have lung cancer.[a]	0.46	0.364
	16	Others assume that a patient's lung cancer was caused by smoking, even if he or she had stopped smoking years ago.	0.464	0.434

[a] A component of the original CLCSS.

feeling?". The item total correlation was used to evaluate the differentiation of the scale for each item. Significant differences were detected for all items except the 22nd, 23rd, 24th items with correlations of 0.103, 0.125, and 0.131 respectively. These three items were thus removed from further analysis. These results indicate that the Chinese modified CLCSS generates statistically significant data with respect to item differentiation scales.

3.2. *Validity test of the scale*

3.2.1. *Content validity*

The expert panel determined that the 1st, 2nd, 6th, 7th, 8th, 30th, 35th items of the original CLCSS did not apply to Chinese lung cancer patients, so these items were removed while modifications to other items. For example, the phrase "I think my situation is not as good as others because of the lung cancer" was revised to "I think my situation is worse than others because of the lung cancer". The Content Validity Index (CVI) were adopted to assess the validity of the scale, with a CVI >0.7 indicating a valid scale. The CVI of the Chinese version of Cataldo Lung Cancer Stigma Scale was 0.875, indicating that the Chinese CLCSS is a valid method for measuring lung cancer stigma.

3.2.2. *Exploratory factor analysis*

The Kaiser-Meyer-Olkin (KMO) statistic of the sample in this study was 0.752; The Bartlett Sphericity Test in this study was 2413.93 (Degrees of Freedom = 378), which was statistically significant ($p < 0.01$), indicating that factor analysis of the Chinese CLCSS was appropriate. The principal component analysis is using a mean eigenvalue curve indicates that there were four eigenvalues in the screen plot above the mean eigenvalue, so these four factors were retained. After rotation, a single item with a factor loading of <0.4 was deleted, and rotation was again performed. Four factors were extracted by an exploratory analysis, these could explain 58.6% of the total variance in the results (Table 1). These four factors were stigma and shame, social isolation, discrimination, and smoking status, which is in agreement with the original CLCSS.

3.2.3. *Criterion-Related Validity*

Statistical analysis indicates that self-esteem scores correlated negatively with the total stigma score and all subscales.

Table 2 – Criterion-Related Validity of Chinese version of CLCSS (n = 117).

	Total scale	Stigma and shame	Social isolation	Discrimination	Smoking
Rosenberg Self-esteem Scale	−0.688**	−0.670**	−0.458**	−0.441**	−0.350**
Self-Rating Depression Scale	0.368**	0.361**	0.418**	0.372**	0.410**

*$p < 0.05$; **$p < 0.01$.

By contrast, the Self-Rating Depression Scale, was positively related to the total scale scores and all subscales scores (Table 2).

3.3. *Reliability test of the scale*

3.3.1. *Homogeneity reliability*

The homogeneity reliability scores for our Chinese CLCSS are provided in Table 3. The Cronbach's α coefficient of the Chinese version of CLCSS and the four primary factors ranged from 0.599 to 0.868. The coefficient for the Chinese CLCSS as a whole was 0.844. These data indicate that the Chinese CLCSS is highly reliable.

3.3.2. *Test–retest reliability*

To assess test–retest reliability, we re-administered the questionnaires to 40 extracted patients three weeks after the initial survey. The resulting coefficient alpha of the total stigma scale and the four primary factors was 0.880, 0.881, 0.788, 0.601, and 0.633 respectively. These results indicate a high degree of consistency between repeat testing using the Chinese CLCSS.

4. Discussion

4.1. *Validity evaluation of the scale*

Following evaluation and revisions by a group of experts, we demonstrate that the Chinese Version of the CLCSS can accurately reflect the psychological status of the lung cancer patients experiencing lung cancer-related stigmas. The CVI of the scale was 0.875, higher than the reference value of 0.79, indicating a high degree of content validity [13].

Four factors were extracted in an exploratory factor analysis that account for 58.6% of the total variance in our study, similar to that of original CLCSS (57%) [2]. Criterion-Related Validity shows that the questionnaire total score and each factor were negatively correlated with Rosenberg Self-esteem Scale (correlation coefficient = −0.35 ~ −0.688, $p < 0.01$), and the total score and individual factors were positively correlated with Self-Rating Depression Scale (correlation coefficient = 0.361–0.418, $p < 0.01$). Based on these data, we conclude that the Chinese CLCSS has a large degree of Criterion-Related Validity.

Table 3 – Criterion-Related Validity of Chinese version of CLCSS.

Dimensions	Coefficient of alpha
CLCSS	0.884
Stigma and shame	0.868
Social isolation	0.818
Discrimination	0.599
Smoking	0.601

4.2. *Reliability evaluation of the scale*

Internal consistency Cronbach's alpha coefficient of the original CLCSS is 0.656, which is used as a standard to compare to our modified scale [14]. In our analysis, the coefficient alpha of Chinese version of CLCSS and the individual subscales ranged from 0.599 to 0.884, and the test–retest coefficient ranged from 0.601 to 0.881, indicating that the Chinese CLCSS is both highly valid and reliable for measuring the stigmas experienced by lung cancer patients.

4.3. *Limitations and shortcomings of the research*

One limitation of this study is that relatively small sample size. Our sample size was limited in scope, due in part to the level of hospital from which the patient population was selected. The depth of the survey sample was also limited limitations, thereby limiting the reliability index of the Chinese CLCSS. The number of patients who completed the questionnaire and participated in in-depth interviews was small, which could alter the distribution of items on the scale. In China, especially in the northern region, for the protection of patient's physical and mental health, patients' families often do not inform the patients that they are suffering from lung cancer for fear that they will not participate in the appropriate therapy, thus many patients were unaware that they had lung cancer. In the case of our study, the families were worried that the patient may have adverse psychological implications after completing survey. These factors all likely contributed to the limited sample size. Another limitation was that the age of lung cancer patients is generally high (average age is 58 years) and the reading ability of this population is limited. Thus, parts of questionnaires were explained face to face to the patients by researchers, which could affect the answers given by the patients, leading to deviations in the process of measuring the scale. Further refinements in survey methodology and sample sizes will likely improve the accuracy of the Chinese CLCSS.

5. Summary

The Chinese version CLCSS is a reliable and valid measure of social stigma experienced by Chinese lung cancer patients. We found that lung cancer patients generally experience

some form of social stigma as a result of their disease. Our Chinese CLCSS could serve as a model for developing methods for measuring cancer-related stigma in Chinese populations. We hope that such studies could dramatically improve patient outcomes for a variety of cancers patients in China.

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